

CLAIMS

What are the claims is:

1. An operation method of a kind of heat treatment atmosphere cocatalyst. The
5 characteristic consists in that the cocatalyst is dissolved or dispersed into heat treatment atmosphere material and atmosphere, and the cocatalyst keep up the form of gas phase or finer dispersion (such as mote) and diffuse into atmosphere in the heat treatment equipment or heat treatment gas-producing equipment.
2. The method of using heat treatment atmosphere cocatalyst according to claim 1. The
10 characteristic consists in that the cocatalyst is diffused directly into heat treatment atmosphere material or heat treatment atmosphere in the form of gas phase or finer dispersion, or it is dissolved or dispersed into a kind of or kinds of heat treatment atmosphere material as carry material, and is fed into heat treatment equipment or heat treatment gas-producing equipment with atmosphere material together.
- 15 3. A kind of heat treatment atmosphere cocatalyst. The characteristic consists in that the cocatalyst keep in the form of gas phase or finer dispersion (such as mote), and diffuse into atmosphere material or atmosphere in heat treatment equipment or heat treatment gas-producing equipment.
4. The heat treatment atmosphere cocatalyst according to claim 3. The characteristic
20 consists in that the cocatalyst is dispersed directly into heat treatment atmosphere material or heat treatment atmosphere in the form of gas phase or finer dispersion, or the cocatalyst is dissolved or dispersed into a kind of or kinds of carry material, then they are fed into heat treatment atmosphere material together in heat treatment equipment or gas-producing equipment.

5. The heat treatment atmosphere cocatalyst according to claim 3 or 4. The characteristic consists in that the cocatalyst is selected from Compound halogen element which takes 0.1-4% weight in heat treatment atmosphere material, optimal selection: 0.1-1%; Compound metal element which takes 0.0003-0.03% weight in heat treatment atmosphere material, optimal selection: 0.0003-0.015%; Compound nitrogen which takes 1-10% weight in heat treatment atmosphere material, optimal selection 1-2%; Or said arbitrary combination. Wherein, the Compound metal element is selected from one or arbitrary combination of Cobalt naphthenate, Manganese naphthenate, Nickel nitrate, Manganese nitrate, Ferrocene as well as Ferrocene ramification, optimal selection: Ferrocene, Ferroceneramification; Said Compound halogen element selected from one or their combination of Chlorobenzene, Trichlorobenzene, Chlorotoluene, Nitrochlorobenzene, Trichloroethylene, Ribromomethane, Iodine, Iodinated oil, Iodomethane, Freone, Tetrafluoroethylene. Optimal selection: Chlorobenzene, Trichlorobenzene, Chlorotoluene, Nitrochlorobenzene, or their combination. Said Compound nitrogen selected from one or arbitrary combination of P-Amino-Azobenzene Hydrochloride, Nitrobenzene, Toluenediisocyanate, Nitrochlorobenzene, Nitrobenzene, Trinitrobenzene, Melamine, Tricyanic acid, Dicyandiamide, Guanidine nitrate, Cyclotrimethylenetrinitramine, Pyridine, Pyrazol, Pyraze. Optimal selection: P-Amino-Azobenzene Hydrochloride, Nitrobenzene, Toluene diisocyanate, Nitrochlorobenzene, Nitrobenzene, Trinitrobenzene, Guanidinenitrate, Cyclotrimethylenetrinitramine or their combination.
6. The kind of heat treatment atmosphere cocatalyst according to claim 3 or 4. The characteristic consists in adding certain compound of RE(lanthanum) or RE(cerium)

- which takes 0.1-3% weight in atmosphere material into heat treatment atmosphere or atmosphere material, such as Cerium naphthenates, Lanthanum naphthenates, Cerium Nitrate, Lanthanum nitrateinto, Lanthanum chloride, Cerium chloride, lanthanum fluoride, Cerium fluoride. Optimal selection: Lanthanum Acetate, Cerium Acetate, 5 Lanthanum Oxide, Cerium Oxide or their combination.
7. A method of atmosphere heat treatment of metal material. The method includes heat treating metal material in the atmosphere with cocatalyst or the active atmosphere produced by the cocatalyst. The characteristic consists in said cocatalyst diffusing into atmosphere in the form of gas phase or finer dispersion, and releasing out active 10 substance.
8. The kind of method of atmosphere heat treatment according to claim 7. The characteristic consists in the cocatalyst being dispersed directly into heat treatment atmosphere material or heat treatment atmosphere in the form of gas phase or finer dispersion. Or said cocatalyst said being dissolved or dispersed into a kind of or kinds 15 of heat treatment atmosphere material as carry material, and fed into heat treatment gas-producing equipment or heat treatment equipment with carry material together.
9. The kind of method of atmosphere heat treatment in claim7. The characteristic consists in how to use the cocatalyst in claim 5 or 6.
10. The method of atmosphere heat treatment in claim 7-9. The characteristic consist in 20 using the cocatalyst, carburizing or carbonitriding can be processed in a higher obviously carbon potential, optimal selection: 0.25, better optimal selection:0.15, or in lower obviously temperature, or in short obviously time than without said cocatalyst.
11. A kind of metal material heat treatment atmosphere. Wherein the atmosphere

includes a kind of material cocatalyst which is diffused into said atmosphere in the form of gas phase or finer dispersion and release a kind of material which play a part catalysis and activation to said atmosphere in heat treatment gas-producing equipment or heat treatment equipment. Said cocatalyst is selected from the
5 cocatalyst in claim 3 or 4.

12. A kind of method raising carbon potential and/or depressing the produce of carbon soot, or lowering process temperature in the atmosphere heat treatment of metal material. The characteristic consist in adding the cocatalyst in claim 3-6 into heat treatment atmosphere or heat treatment atmosphere material.